

REMARKS

Claims 33, 65, and 66 have been amended to provide an antecedent basis for the term "the exhalation valve".

Claims 33, 39, 40, 44, 46, 49, 50, 55-59, and 64-65 have been rejected under 35 USC § 103(a) as being unpatentable over British Patent Application 2,072,516 to Simpson in view of U.S. Patent 2,105,183 to Cover and European Patent Application 0252890 to Söderberg. Applicants respectfully submit that this rejection cannot be sustained.

Applicants' invention pertains to a new method of making a filtering face mask. Claims 33, 65, and 66 are representative of the steps that are involved in applicants' method and are reproduced above. The combination of Simpson, Cover, and Söderberg would not have rendered the subject matter of applicants' invention obvious to a person of ordinary skill because the references each demonstrate the opposite.

Applicants' invention pertains to a method of making a filtering face mask that includes attaching an exhalation valve to a mask body. The method also comprises supporting a single flexible flap non-centrally and operatively relative to the orifice of the valve seat to form an exhalation valve, the single flexible flap being supported such that: (i) the flexible flap assumes, in its closed state, a curved profile in a cross-sectional view thereof, which the curved profile comprises a curve that extends from a first point where a first stationary portion of the flexible flap is supported on the valve seat to a second point where a second free portion of the flexible flap contacts the seal surface; (ii) the second free portion of the flap is pressed against the seal surface of the valve seat in a closed state of the exhalation valve; (iii) the second free portion of the flexible flap is held in its closed state under any orientation of the valve, at least in part, by virtue of the curved profile thereof; and (iv) the second free portion of the flexible flap represents the only free portion of the flap and can flex so as to permit exhaled air to pass through the orifice and to provide an open state of the exhalation valve to make the flexible flap out of contact with the seal surface at the second point while the first portion of the flexible flap remains essentially stationary at the first point.

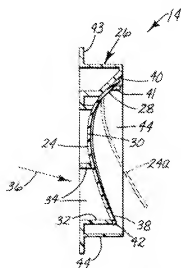


Fig 3

The '516 UK patent application to Simpson discloses a cantilevered valve in Figure 2:

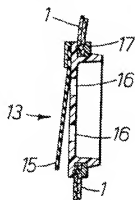
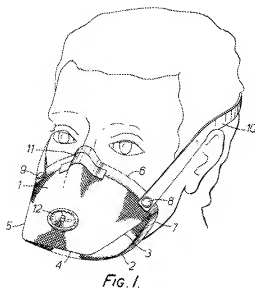


FIG. 2.

As is apparent, the Simpson flap is not curved when secured to the valve seat when a fluid is not passing through the orifice. The Simpson flap also is not pressed towards the seal surface in an abutting relationship with it under any orientation of the mask body. In fact, Simpson recognizes this deficiency in its valve construction. Accordingly, Simpson states that:

To prevent the inhalation of harmful atmosphere owing to leakage of the of each valve, the valve may be provided with an antechamber so arranged that, if the valve does leak in operation, the wearer inhales previously exhaled breath and not the harmful atmosphere.¹

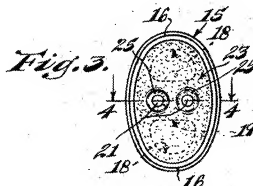
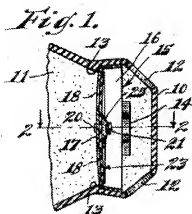
Thus, Simpson overcomes the difficulty in keeping the valve closed by providing an antechamber on the filtering facepiece. As is also seen in Figure 1, Simpson mounts the valve to the top of its duck-billed masks:



In this position, gravity can assist in keeping the valve flap closed. Accordingly it is apparent that Simpson does not appreciate applicants' invention or the benefits that are achieved from it. Simpson suggests solutions (providing an antechamber and mounting the valve to the top of the mask) that are wholly apart from applicants' claimed method.

The '183 patent to Cover illustrates a dual-flap valve where the flap has a slight curvature to it:

¹ See UK Patent Application GB 2,072,516 to Simpson at page 1, lines 58-64.



Cover does not teach or suggest applicants' invention because it discloses a dual-flap system where there is centrally-disposed mounting hardware that interferes with the movement of fluid through the exhalation valve during an exhalation. This teaching of a dual-flap system presents very good evidence that applicants' invention would not have been obvious to a person of ordinary skill. Cover also does not teach or suggest how to provide a single-flap system where there is only one free portion and where that one free portion has the ability to be biased towards the seal surface to keep the flap in an abutting relationship with the seal surface under any orientation of the mask.

The '890 European patent application to Söderberg does teach the benefit of having a flexible flap pressed against the seal surface, but it too achieves this result in a manner entirely different from applicants' invention. As the Examiner recognizes, Söderberg states that the flap should seal against the valve seat:

the rubber material is resilient and if the membrane is given a beveled edge 12, it will seal against the border 3 of the valve seat in a closed position, irrespective of the position assumed by the valve device.²

Söderberg, however, asserts that a good seal can be achieved by providing the valve membrane with a beveled edge. Söderberg does not teach or suggest applicants' method or the benefits that are provided by applicants' method.

² See European Patent Application 0252890 to Söderberg at page 4, lines 14-23.

Please note that the '183 patent to Cover was first published in January of 1938. Yet, none of its teachings were used or modified by Simpson (filed March 1980) or by Söderberg (filed March 1986). Despite Cover's teachings being known to persons of ordinary skill for over 40 years, its technology did not find its way into the flapper-style valve art. Under such circumstances, Cover, Simpson, and Söderberg present very good evidence of nonobviousness.³

The present record shows that the cited references each took very different approaches to purge exhaled air and prevent inward leakage. Simpson used an antechamber, Söderberg used a beveled edge, and Cover used a dual-flap system. None of the references suggest applicants' approach. Nor do any of the references suggest the combination of their teachings. As such, applicants respectfully submit that they have made a contribution to the art for which a patent should be awarded.

Respectfully submitted,

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Date

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³ *In re Ehringer*, 146 USPQ 31, 37 (CCPA 1965) ("Thus, over 40 years elapsed in this art prior to appellant's filing date without anyone suggesting so far as the cited art shows, a non-sag *thoriated* tungsten filament or any way of producing it.").